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METHOD OF MANUFACTURING MICROFIBER WARP-KNIT FABRIC
[GUHKSEH-SEOMYU GYEONGPYEONJI-UHYI JEHJEO BANGBEOP]

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ABSTRACT

The present invention relates to a method of manufacturing warp-knit fabric utilizing microfibers that possess such merits as vapor permeability and flexibility and that have excellent surface texture, drapability and tear strength. It aims to provide a method of manufacturing warp-knit fabric wherein a warp is knitted to form a warp-knit fabric, then undergoes finishing, characterized by blending extraction-type polyester fibers, whose single-fiber fineness can be microfiberized to less than 0.07 denier, with yarns, whose single-fiber fineness is 15-30 denier, and multifilaments, whose single-fiber fineness is 2-3 denier, to knit the warp; and by napping the surface before applying heat of a set temperature and, after pre-setting, extracting said polyester fibers' extract component to finish.

SPECIFICATION

Detailed Description of the Invention

Objective of the Invention

Field of the Invention and Existing Art in the Field

The present invention relates to a new method of manufacturing microfiber warp-knit fabric; more specifically, it relates to a method of manufacturing microfiber warp-knit fabric that not only is soft and of excellent drapability, but whose tear strength is also excellent.

Generally, fabrics that use microfibers are widely employed for apparel because, aside from their soft surface texture, they also possess such merits as a subtle and unique gloss effect and heat retention.

Methods of manufacturing microfibers may be classified into three types: direct spinning, split-type bicomponent spinning and extraction-type bicomponent spinning. The possible fineness of microfibers manufactured by direct spinning is about 0.3-0.5 denier, that by split-type bicomponent spinning about 0.2 denier, and in contrast that by extraction-type bicomponent spinning may be as much as 0.001-0.05 denier.

Microfibers ordinarily used in the manufacture of woven fabric or artificial suede are extraction-type microfibers. In the case of woven fabric employing extraction-type microfibers, because there is the drawback that after extraction of the extract component, the tear strength of the woven fabric declines and its strength weakens, it is woven by blending microfibers with high-shrinkage fibers, and examples of woven fabrics thus manufactured can be currently seen.

On the other hand, knitted fabric is manufactured quickly, is flexible, is of high elasticity and high permeability amount, and does not wrinkle easily; but because of the characteristics of microfibers, the technology of utilizing microfibers in warp-knitted fabric, in particular, which is manufactured faster than weft-knitted fabric, and commercializing it have not been developed compared to woven fabric.

That is, in the case of utilizing, in knitted fabrics, microfibers that have been manufactured by the direct spinning method, many filaments are broken up, and so the warping is very inferior, and the surface texture and writing effect of the surface of the completed product become inferior. And in the case of utilizing, in knitted fabrics, microfibers that have

been manufactured by the bicomponent extraction-type composite spinning method, because the fibers which normally split possess immiscibility, the tension and friction during warping and refining cause the bicomponents to separate, and the warp and knittability deteriorate.

Also, in the case of using, in knitted fabric, yarns that have been manufactured by the bicomponent extraction-type spinning method, not only warp and knittability, but also the appearance of the manufactured warp-knit fabric may be good; however, because the sea component is extracted and microfiberized in the finishing phase, not only is it overly soft, but the tear strength also declines, so there is an incongruous aspect in putting it into practical use.

Technical Task the Invention Seeks to Accomplish

In order to achieve the foregoing objective, the present inventors faced the fact that commercialization is not possible in the case of utilizing microfibers in the field of microfiber warp-knit fabrics because of the variety of flaws occurring during finishing, and, through various researches to overcome such flaws, completed the present invention as follows.

That is, the objective of the present invention lies in providing a method of manufacturing microfiber warp-knit fabric wherein microfibers are utilized for a warp-knit fabric that does not wrinkle easily, that allows great vapor permeability, that is flexible and of good shrinkage, and whose manufacturing speed is fast, thereby complementing good surface texture and excellent appearance.

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In order to achieve the foregoing objective, the present invention's method of manufacturing warp-knit fabric is a method of manufacturing warp-knit fabric wherein a warp is knitted to form a warp-knit fabric and undergoes finishing, characterized by blending extraction-type polyester fibers, whose single-fiber fineness can be microfiberized to less than 0.07 denier, with yarns, whose single-fiber fineness is 15-30 denier, and multifilaments, whose single-fiber fineness is 2-3 denier, to knit the warp; and by napping the surface before applying heat of a set temperature and, after pre-setting, extracting said polyester fibers' extract component to finish.

And it is recommended that the blending ratio of said yarns be 5-20% of the weight of the warp-knit fabric finally processed, and the blending ratio of said multifilaments be 15-30% of the weight of the warp-knit fabric finally processed.

Composition and Operation of Invention

Below, the composition and operation of the present invention is explained in detail through concrete embodiments and such.

As above, the present invention's method of manufacturing warp-knit fabric is a method of manufacturing microfiber warp-knit fabric wherein when the warp is knitted, extraction-type polyester fibers, whose single-fiber fineness can be microfiberized to less than 0.07 denier, are blended with yarns, whose single-fiber fineness is 15-30 denier, and multifilaments, whose single-fiber fineness is 2-3 denier; and wherein after the warp-knit fabric is manufactured, finishing is done with the fabric's surface being napped, then pre-set, and after passing through

the weight-reduction process where said extraction-type polyester fibers' extract component is extracted, dyeing, buffing, etc. It is recommended that the blending ratio of said yarns be 5-20% of the weight of the warp-knit fabric finally processed, and the blending ratio of said multifilaments be 15-30% of the weight of the warp-knit fabric finally processed.

In such a manufacturing method, the reason for using extraction-type polyester fibers that can be microfiberized to less than 0.07 denier is that if the microfibers' fineness is thicker than 0.07 denier, the soft surface texture becomes inferior, and it becomes impossible to manifest not only quality, but writing effect as well.

And the reason for blending yarns whose fineness is of 15-30 denier is to endow the warp-knit fabric with drapability. In the case of single-fiber fineness being less than 15 denier, a large quantity needs to be used in order to maintain drapability and this has the unfavorable effect on the soft surface texture that is characteristic of microfibers. In the case of single-fiber fineness exceeding 30 denier, warp, weavability and other such procedural properties deteriorate. The ratio of yarns is limited to 5-20% of the weight of the fabric finally processed because if it is less than 5% of the fabric weight, it would be difficult to exhibit drapability, and if it exceeds 20%, the drapability is overdone, causing the soft surface texture of the microfibers to be attenuated.

In order to enhance the tear strength of the final processed warp-knit fabric, said multifilaments whose single-fiber fineness is 2-3 denier are used, and a blending ratio of 15-30% of the warp-knit fabric finally processed is favorable.

A warp-knit fabric thus knitted with three kinds of thread may be manufactured using several types of knitting machines; as an example, a single-needle, three-guide, three-bar tricot knitting machine may be used.

After napping the surface of a warp-knit fabric thus knitted, it is pre-set at a designated temperature, and after passing through the weigh-reduction process where said extraction-type polyester fibers' extract component is extracted, it undergoes dyeing, buffing, and such of a finishing process until finally setting is done; thus manufacturing a microfiber warp-knit fabric.

Embodiment 1

With polyethylene terephthalate as the island component and polyester copolymer, which has excellent alkali solubility, as the sea component, the sea component is extracted and extraction-use polyester fibers whose ultra-micro-fineness is 0.05 denier are formed. These are used together with tear-strength reinforcement-use multifilaments whose mono-filament is 2.5 denier in fineness at a blending ratio of 29%, and with yarns with a fineness of 20 denier at a blending ratio of 11%. Thus is a warp-knit fabric of 23 C/cm density knitted.

The warp-knit fabric thus manufactured is napped, and after pre-setting under speed conditions of 25 m/min and a temperature of 190°C, reduced by soaking in sodium hydroxide solvent maintaining a temperature of 98°C, passed through dyeing and buffing processing, then finally set under speed conditions of 25 m/min; thus is a microfiber warp-knit fabric manufactured.

Example 1

With polyethylene terephthalate as the island component and polyester copolymer, which has excellent alkali solubility, as the sea component, the sea component is extracted and extraction-use polyester fibers whose ultra-micro-fineness is 0.09 denier are formed. These are used together with tear-strength reinforcement-use multifilaments whose mono-filament is 2.5 denier in fineness at a blending ratio of 29%, and with yarns with a fineness of 20 denier at a blending ratio of 11%. Thus is a warp-knit fabric of 23 C/cm density knitted.

The warp-knit fabric thus manufactured passes through the same finishing process as Embodiment 1 above; thus is a microfiber warp-knit fabric manufactured.

Example 2

With polyethylene terephthalate as the island component and polyester copolymer, which has excellent alkali solubility, as the sea component, the sea component is extracted and extraction-use polyester fibers whose ultra-micro-fineness is 0.05 denier are formed. These are used together with tear-strength reinforcement-use multifilaments whose mono-filament is 2.5 denier in fineness at a blending ratio of 23%, and with yarns with a fineness of 10 denier at a blending ratio of 15%. Thus is a warp-knit fabric of 23 C/cm density knitted.

The warp-knit fabric thus manufactured passes through the same finishing process as Embodiment 1 above; thus is a microfiber warp-knit fabric manufactured.

Example 3

With polyethylene terephthalate as the island component and polyester copolymer, which has excellent alkali solubility, as the sea component, the sea component is extracted and extraction-use polyester fibers whose ultra-micro-fineness is 0.05 denier are formed. These are used together with tear-strength reinforcement-use multifilaments whose mono-filament is 2.5 denier in fineness at a blending ratio of 11%, and with yarns with a fineness of 20 denier at a blending ratio of 35%. Thus is a warp-knit fabric of 23 C/cm density knitted.

The warp-knit fabric thus manufactured passes through the same finishing process as Embodiment 1 above; thus is a microfiber warp-knit fabric manufactured.

The microfiber warp-knit fabrics of the embodiment and examples above were evaluated on the following items, and [the results] are shown in Table 1 below.

1) Softness

Based on the results of sensory inspections by 10 experts, the quality was classified as ⊙ when 8 or more persons judged it soft, △ if 5-7 people judged it soft, and x if 8 or more people judged the softness inferior.

2) Drapability

Based on the results of sensory inspections by 10 experts, the quality was classified as ⊙ when 8 or more persons judged it drapable, △ if 5-7 people judged it drapable, and x if 8 or more people judged the drapability inferior.

3) Writing effect

Based on the results of sensory inspections by 10 experts, the quality was classified as ⊙ when 8 or more persons judged the writing effect present, △ if 5-7 people judged the writing effect present, and x if 8 or more people judged the writing effect inferior.

4) Appearance

Based on the results of sensory inspections by 10 experts, the quality was classified as ⊙ when 8 or more persons judged the appearance favorable, △ if 5-7 people judged the appearance favorable, and x if 8 or more people judged the appearance inferior.

5) Tear Strength

The wale direction's tear strength was measured according to the tongue method specified in JIS L1096.

TABLE 1

Quality Characteristics Comparison of Microfiber Warp-Knit Fabrics

Classification	Softness	Drapability	Writing Effect	Appearance	Tear Strength(kg)
Embodiment 1	⊙	⊙	⊙	⊙	1.5
Example 1	△	⊙	x	△	1.2
Example 2	⊙	x	⊙	△	1.3
Example 3	⊙	△	⊙	△	0.8

According to the results of Table 1 above, it can be found that the microfiber warp-knit fabric of Embodiment 1 manufactured based on the present invention excelled in softness, drapability, writing effect,

appearance and tear strength.

Ramifications of the Invention

As stated above, the present invention's method of manufacturing microfiber warp-knit fabric, by utilizing microfibers in knitted fabrics, enables the manufacture of warp-knit fabric, whereby the manufacturing speed thereof becomes relatively faster than the speed of manufacturing woven textiles, and problems such as the reduction in drapability and in tear strength that occur when microfibers are utilized in the manufacture of knitted fabrics may be resolved. The microfiber warp-knit fabric manufactured according to this manufacturing method possesses the merits, such as vapor permeability, shrinkage and flexibility, of knitted fabrics, while also making possible the acquisition of the characteristic softness, unique appearance and such of microfibers.

(57) Scope of Claims

Claim 1

A method of manufacturing microfiber warp-knit fabric wherein a warp is knitted to form a warp-knit fabric and undergoes finishing, characterized by blending extraction-type polyester fibers, whose single-fiber fineness can be microfiberized to less than 0.07 denier, with yarns, whose single-fiber fineness is 15-30 denier, and multifilaments, whose single-fiber fineness is 2-3 denier, to knit the warp; and by napping the surface before applying heat of a set temperature and, after pre-setting, extracting said polyester fibers' extract component to finish.

Claim 2

The method of manufacturing microfiber warp-knit fabric according to Claim 1, wherein the blending ratio of said yarn is 5-20% of the weight of the warp-knit fabric finally processed, and the blending ratio of said multifilaments is 15-30% of the weight of the warp-knit fabric finally processed.